INFRARED SPECTRUM OF N-OXIDOHYDROXYLAMINE [•ONH(OH)] PRODUCED IN REACTION H + HONO IN SOLID $PARA$-HYDROGEN

KAROLINA ANNA HAUPA, *Applied Chemistry, National Chiao Tung University, Hsinchu, Taiwan*; YUAN-PERN LEE, *Applied Chemistry, National Chiao Tung University, Hsinchu, Taiwan, Institute of Atomic and Molecular Sciences, Academia Sinica, Taipei, Taiwan*.

Hydrogenation reactions in the N/O chemical network are important for an understanding of the mechanism of formation of organic molecules in dark interstellar clouds, but many reactions remain unknown. We present the results of the reaction H + HONO in solid $para$-hydrogen (p-H_2) at 3.3 K investigated with infrared spectra. Two methods that produced hydrogen atoms were the irradiation of HONO molecules in p-H_2 at 365 nm to produce OH radicals that reacted readily with nearby H_2 to produce mobile H atoms, and irradiation of Cl_2 molecules (co-deposited with HONO) in p-H_2 at 405 nm to produce Cl atoms that reacted readily with nearby H_2 to produce mobile H atoms. In both experiments, we assigned IR lines at 3549.6 (ν_1), 1465.0 (ν_3), 1372.2 (ν_4), 895.6/898.5 (ν_6), and 630.9 (ν_7) $\mathrm{cm}^{-1}$to N-oxidohydroxylamine [•ONH(OH)], the primary product of HONO hydrogenation. The assignments were derived according to the consideration of possible reactions and comparison of observed vibrational wavenumbers and their IR intensities with values predicted with the B3LYP/aug-cc-pVTZ method of quantum-chemical calculations. The agreement between observed and calculated D/H- and $^{15}N/^{14}N$-isotopic ratios further supports these assignments. The role of this reaction in the N/O chemical network in dark interstellar clouds is discussed.